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How to Make Cutouts





How to Make Cutouts

A HANDBOOK OF

practical methods of cutting and creasing for
advertising novelties, paper boxes, etc.,
on platen, cylinder and
rotary presses



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How to Make Cutouts



ONE of the special branches of the printing industry which have developed to great proportions during the last few decades is that devoted to cutting and creasing of cardboard and paper stocks. This does not refer to the paper box making section of the trade exclusively. There are many other demands for cutting and creasing work on presses, such as for example, the cutting out of various shapes for advertising purposes; the cutting out of leather novelties; the cutting and creasing of wall pockets (out of cardboard); fancy calendars; fans; labels; coin-cards; jewelers' display cards for holding cuff links, chains, etc.; cut-out mats for holding photographs; cut-out toys in cardboard; odd-shaped toy books; large colored pictures such as are used extensively for advertising displays in stores; and many other cardboard and paper things of this class.

There is really no limit to the field of cutting and creasing in the various lines mentioned. The paper box industry is a big world of activity by itself. Another great field is that of advertising novelties. Still another special branch of cutting and creasing is

formed by manufacturers of photographic mountings. The remarkable fact is that any practical typographical printer is capable of doing any of the cutting and creasing work essential for the purposes stated in the foregoing. He can do a lot of this work, right in his plant, without having special machinery installed.

While it is possible for the printer to do all kinds of cutting and creasing on ordinary printing presses of the Colt's Armory and Hartford type, yet if it is his intention to go in for cutting and creasing extensively, it is advisable for him to have regular cutting and creasing presses put in. To produce this class of work under the best mechanical conditions, it would be well for the printer also to have installed a special steel-rule-bending machine, a special steel-rule-cutting device, and a jig saw. With these machines, along with special furniture racks, and a large work table, the printer, or any other skilled craftsman, would have a complete cutting and creasing plant.

This book was written and printed for the purpose of offering practical information about the work of cutting and creasing. The writer will attempt to explain how the steel dies are made of the steel cutting rule; how the creasing rules are made up; how forms are made up; how dies for cutting and creasing are

made ready on the presses; how steel dies for cutting advertising novelties are constructed; how such forms are made ready on the presses; and so forth. It is the writer's desire to give plain, simple facts, and it is to be hoped that even the novice, or the apprentice, will be able to follow these facts intelligently.

MATERIAL NECESSARY FOR MAKING STEEL DIES

When making up a form for cutting and creasing folding boxes, two kinds of steel rule are used — hard steel cutting rule, and hard steel creasing rule. In cases where there is to be rule bending done, as for interlapping corners of folding boxes, soft steel cutting rule is used for the bending.

All of the three kinds of steel rule can be bought from the printers' supply dealers, from the type-founders, or from the manufacturers of the steel rule. The rule comes in strips, from twenty-four inches to thirty inches long. In height the rule is .923 of an inch, which is slightly higher than printers' brass rule, which is .918 of an inch in height. The creasing rule is about the height of ordinary brass rule, and it is blunt on both edges. All of this steel rule is sold by the foot. It should be bought in full strips, to be cut to desired sizes as needed.

Many box-makers use worn steel cutting rule as

creasing rule by turning it upside down in the forms. It would be well, however, to have a supply of regular creasing rule on hand. All of the steel rule is made in two-point width, the width or thickness of printers' two-point leads. There is no reason for having the rule made thinner or thicker than two points.

When making a steel-cutting die for round, or odd-shaped advertising novelties, fans, cardboard toys, etc., the soft steel cutting rule is used, as it will bend to various forms easily. The hard steel rule would break in the bending. The hard steel rule is used when making straight-line dies for cutting advertising specialties, such as squares, oblongs, diamonds, key-stones, and the like, as no round bending of the rule will be necessary for this class of die-work.

KINDS OF FURNITURE USED IN MAKE-UP

Steel, wood, lead and iron furniture are used when making up steel rule cutting dies for forms of paper boxes, straight-line forms for the cutting out of novelties, etc.

First, there is the steel sectional furniture, notched at the ends, such as can be found in practically every large composing-room. This steel furniture can be bought in regular fonts from the printers' supply houses, or from the typefounders. It can be had in

twenty-four-point, with twelve-point notch; thirty-six-point with eighteen-point notch; forty-eight-point with three twelve-point notches; fifty-four-point with two eighteen-point notches. It is furnished in a full range of lengths, all the way up to twenty-four inches in length. Almost any size oblong or square can be built with four selected pieces of the steel furniture. It is of great utility for blanking out large forms of steel-cutting and creasing rules. It can be assembled very rapidly, and a big form is made light in weight through its use. Another important feature about it is that it is absolutely accurate. This can not be said of ordinary wood furniture.

Second, improved metal (lead) furniture is also used in the make-up of dies for folding box work. This is the regular metal furniture which all printers use in connection with type forms, etc. It can be purchased in fonts from the typefounders or any of the printers' supply houses. It comes in a wide variety of sizes. The improved metal furniture is used to fill in the smaller blank spaces of a die form. In the cases of intricate forms where a number of the smaller steel dies are made up in "gangs," the metal furniture is used entirely for blanking out space.

Third, enlarged iron furniture, and regular iron furniture, are used to some extent in the building of

steel-cutting rule forms. The enlarged iron furniture is lighter in weight than ordinary lead furniture. It comes in many sizes, but the larger sizes, such as for example, twenty-five-by-one hundred ems (pica), are most popular for blanking out big die forms. There are two round holes in each piece of enlarged iron furniture, and the die-maker can handle the sections easily by placing his fingers in the round holes. This iron furniture can be bought in fonts from the manufacturers, or from the printers' supply dealers. It is less expensive than the patented steel furniture.

The ordinary iron furniture is made in smaller pieces. It can be bought in assorted fonts to suit the requirements of the plant. It is strong, accurate and economical, and it will stand hard wear for many years.

There is also what is known as mammoth iron furniture, made in sizes all the way up to sixty-by-one hundred and twenty ems (pica). Large round holes are in each piece of the mammoth iron furniture, which make it light in weight and easy to handle. It can be bought in fonts of various combinations. It is not very costly.

Cabinets for holding the labor-saving steel, lead, enlarged iron, regular iron, and mammoth iron furniture, can be had from the manufacturers, or from

the typefounders. It would be well for every box-maker ordering any of the various kinds of metal furniture mentioned, to order cabinets for it. The cabinets are so constructed that the furniture can be stored systematically. Thus, the die-maker can see at a glance what pieces are in the cabinets to work with. Time is gained, as the die-maker doesn't find it necessary to "sort out" the sections needed as he is building. Every piece is plainly marked as to size, and the places where the different lengths of furniture are kept are also marked on the cabinets. The paper-box manufacturer who desires to get the maximum of production in his die-making department should have a generous supply of metal furniture, and there should always be plenty of it in the cases or cabinets. The die-maker will soon lose several hours' time if he is forced to search for furniture for every form. He should have an abundance of material to work with, and everything should be kept systematically.

Fourth, wood furniture is used in practically all box manufacturing factories for the making up of large, open die-forms. That is, forms which contain only a few steel rules and plenty of blank space. The kind of wood known as black cherry is best for the purpose, on account of the resistance it offers to atmospheric changes. Soft, porous wood furniture

would take moisture in damp weather, and would swell and expand, affecting the positions of the rules to some extent. That would in many cases ruin the register of the dies, and would cause the cutting and creasing rules to move out of true position, thus damaging the counter-die.

Black cherry is therefore the best wood to use for blanking out certain kinds of steel-die forms, although other hard woods may be used with fair results.

Many of the larger box-makers buy the black cherry in the shape of long boards, direct from the lumber dealer.

Some of the smaller box-makers purchase the black cherry wood in long strips from mills in the neighborhood.

The wood is cut to sizes desired on a circular saw by the die-maker as he builds up the die. The standard thickness which the black cherry board should be for die-work is about eleven-sixteenths of an inch. This is just high enough for the wood to keep the rules standing firmly, and it allows for effective corking in the make-ready.

One of the advantages of the wood furniture is that it is inexpensive, and large die-forms containing the wood can be kept standing without tying up the more expensive steel, lead, or iron furniture. It should be

understood, however, that some metal furniture, in the smaller sizes, is used in combination with the wood furniture when building a steel cutting and creasing die-form. The metal furniture is generally used for filling in the outer corners of box-dies, also for filling in little places where the wood has not reached. The plan is to cut large square or oblong blocks of the black cherry; place these in the main openings of the steel die; then to complete the blanking-out with small pieces of lead or iron furniture.

Some box-makers use regular printers' wood labor-saving furniture for blanking-out certain portions of steel-die forms, but this kind of material is not so well adapted to the work as the cherry wood, as the ordinary printers' wood furniture is not as high as eleven-sixteenths of an inch. The lower material is all right for lock-up furniture to be used around the inside of the chase.

Fifth, for intricate, odd-shaped steel-cutting dies, circles, ovals, dies for cutting toy soldiers of cardboard, flowers, etc., large boards are used for holding the steel-cutting rule. The places which are to hold the rules are cut out of the board with a jig saw. Laminated board, five-ply, eleven-sixteenth of an inch in thickness, is preferable to all other wood for work of this character. It may not always be easy for one to

obtain the laminated boards, in which case the black cherry boards, or other hard wood, will serve.

THE WORK-TABLE

One of the most essential things which the die-maker must have is a first-class work-table. There is nothing better for this class of work than a regular printers' imposing stone, although the die-maker could build a table especially for the purpose with little difficulty. One box manufacturer has several of the new style steel imposing tables in his plant on which the die-makers construct and lock up the steel-die forms. These tables are of steel throughout. The imposing surface is of the best steel, smoothly planed. The tables contain drawers in which are stored locking-up quoins, locking keys, the steel cutting and creasing rules in full-length strips, mallets, and other tools. Underneath the imposing-tables are cabinets stocked with steel, lead, iron and wood furniture.

Not far from the imposing-tables are a power jig saw, power circular saw, and a large work-bench equipped with a special steel-rule cutter, special steel rule bending machine, vise, and all kinds of pliers and other tools which the die-maker finds useful in his craft. So efficient is this arrangement of a die-making department that the die-maker can accomplish a

great deal of work without it being necessary for him to waste many steps going after material, tools, etc. Everything necessary to work with is within arm's reach, so to speak.

Another box manufacturing concern has the work-room arranged on the same plan as the one just described, with the exception that the imposing-tables are of hardwood with stone tops, instead of being steel construction. An imposing stone such as many printers use is cut from hard marble, and it will do very well for the purposes of the die-maker. The steel surface will last longer, of course.

Some of the smaller box-makers have had their own work-tables built of ordinary lumber with tops of hardwood, or of stone. These work-tables are large and they contain spacious drawers in which are stored the long strips of steel-cutting and creasing rules, pliers, mallets, and other tools. On a smaller work-bench, close to the imposing-table, is kept the vise, rule-cutter, and the rule-bending machine. Furniture cabinets are set up over the imposing-table, so that the die-maker can easily reach for the furniture as he is building a steel-die form.

An imposing-table with a hardwood surface will last for a long time with care. It is a good plan, however, to have the surface covered with a sheet of metal

such as zinc, or heavy tin, for instance. A stone top, or a steel top, would be better.

The handy craftsman could build an imposing-table, and a work-bench, to suit the requirements of the plant, from any kind of smoothly-planed lumber. The legs can be made of 3x4 (inches) white pine, or of other wood which can be sawed easily. It is advisable to construct the table and work-bench in a craftsman-like manner. If the die-maker is not clever at work of this character, it would be better to call in a carpenter. Standard imposing-tables, and work-benches, of wood and stone, or of all-steel, can be bought from the printers' supply dealers.

EQUIPMENT NECESSARY FOR A FIRST-CLASS CUTTING AND CREASING DEPARTMENT

While it is the writer's intention to explain how cutting and creasing can be done on ordinary platen and cylinder presses, with the aid of commonplace tools, yet it should be understood that if a person is to start in the cutting and creasing business the right way, special tools and machinery will certainly give better results than makeshifts. But, it may be that some readers would prefer to start the work of cutting and creasing with ordinary tools and machinery which are already in their possession, with the idea

of adding the special equipment later on as the field developed. It would seem worth while, then, to offer a few facts, further ahead in these articles, covering cutting and creasing with ordinary tools and machinery. Under certain conditions, it is possible to produce excellent work on regular platen and cylinder presses.

The special equipment essential for the operation of a modern cutting and creasing department would be as follows :

Large size cutting and creasing press with individual motor.

Smaller size cutting and creasing press with individual motor.

Jig-saw with motor.

Circular-saw with motor.

Steel rule-cutting machine.

Steel rule-bending machine.

Imposing-table, medium size.

Work-table.

Steel, lead, iron, and wood furniture, the metal furniture in a full range of sizes.

Cabinets for holding metal furniture.

Tools such as pliers, files, hammer, mallet, vise, etc.

Steel cutting rule in full-length strips.

Steel creasing rule in full-length strips.

Corks in assorted sizes; rubber in cubes; LePage glue.

With this equipment, the manufacturer would be in a position to produce practically any class of folding-box work, also any kind of cutting for advertising

novelties, cardboard toys, photograph mounts, and so forth. He could make up steel-die forms of every variety, and he could construct the dies rapidly, as he would have all of the tools and material essential for the production of steel-cutting and creasing dies. His presses would be capable of handling almost any job of cutting and creasing which would come to the average establishment.

MAKING THE MODEL OR "DUMMY"

The size and style of a folding box are ascertained by first having a model or "dummy" made of cardboard, or box-board. The model is formed with the aid of pencil, ruler, and a pocket-knife. After it has been cut out with the pocket-knife, the dummy is folded up to see that everything is all right before building the die. There are so many different kinds of folding boxes on the market that it is impossible to give descriptions of all. For example, there are flat paper boxes made especially for holding things such as neckwear, suspenders, garters and handkerchiefs. Then, there are folding boxes for cereals and other foods in wide variety. Paper boxes of every size and shape are used for holding medicinal supplies, perfumery bottles, toilet requisites, etc. There is actually no end to the line of work in the box industry.

The enterprising box-maker can "create" orders for his plant by scheming out new ideas in folding boxes and novelties. It is an easy matter to have dummies made up, as new lines of goods appear on the market, and the models are often the means of securing substantial orders. When the box manufacturer desires to make a die for some box or novelty which is already in general circulation, he simply takes one of the cardboard articles in question, opens it out flat, and he then has a model from which his die-form can be made. The sizes of the various pieces of cutting or creasing rule are marked down on the dummy so that when the die-maker is building his form he will have specific measurements to follow.

BUILDING A CUTTING AND CREASING DIE

In the majority of cases, the die-maker first takes his dummy and studies it to find how many pieces of steel cutting rule will be needed, also the number of pieces of creasing rule. He jots down the figures—the number of pieces required, and the various sizes—on a pad of paper. He then cuts all of the steel rule which is to be used in the form on the steel-rule cutting machine. Hard steel cutting-rule is used for dies of this character. It is possible to use an ordinary lead and rule-cutter for hard steel rule, provided that the

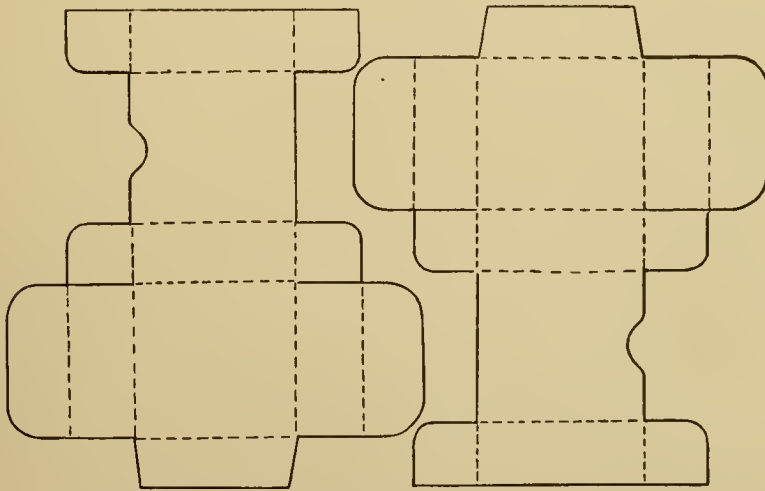
machine be kept sharpened with the cutting parts set very tight. But, there are many advantages derived through having a special steel-rule cutting machine for this work.

After all of the rules have been cut to the necessary sizes, the die-maker starts to assemble them in the form. A chase is placed on the imposing-table; ordinary wood furniture is placed in the chase, in such an arrangement that there will remain the exact space to be occupied by the die; then, as the pieces of rule are put in, the die-maker blanks out with furniture. Sections of black cherry board are placed in the larger openings. When the openings are very spacious, squares and oblongs are made for them of the steel sectional furniture. Smaller spaces are filled in with pieces of the lead furniture or iron furniture.

In many instances, a large, plain cutting and creasing die can be blanked out almost entirely with blocks of black cherry wood. The corners of the die are filled in, however, with small sections of metal furniture. The die-builder cuts the pieces of wood furniture to sizes required, on the circular saw as he makes up the form. Or, it may be that there are cut pieces of the wood in stock which can be utilized. Whenever feasible, wood or open lead furniture is placed next to the cutting rules, on each side of them, on account of it

being easier to attach corks to the wood, or open lead furniture, than to the steel sectional furniture.

Often as many as half-a-dozen complete cutting and creasing dies are made up together in a single form. This is what box-makers term "gangs of die-forms." Frequently complete forms for cutting and creasing a paper box and its lid are run together in



How dies interlock to save space and stock. Dotted lines indicate creasing rules; plain lines represent cutting rules

the same chase. Through this plan valuable time is gained, and there is a certain saving in stock. The die-builder studies to have all of the dies laid out in the chase to the best advantage so that there will be little wastage of stock in the cutting. When forms

are run in "gangs," the dies are set close to each other so that when the finished sheets are cut apart there will be no trimming necessary.

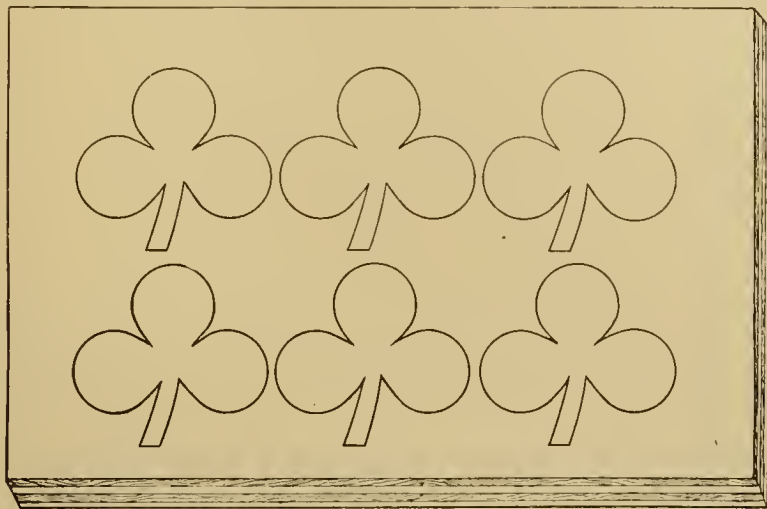
It is not essential to miter the corner of steel cutting rules in a cutting and creasing form. The little opening caused by the rules not setting close together is of advantage. This little space allows for the corners of the stock holding to the full sheet of box-board during the cutting and creasing operation. The corner pieces of the finished sheets are pulled apart, or knocked out, after the sheets have been removed from the press.

The width of the average crease in a folding box die form is two points. A single piece of scoring rule makes a crease of this size. On heavy stock where it is desirable to have the creasing lines wider than two points, several strips of the creasing rule are placed close together. Two pieces press a scoring line of four points; three pieces of the rule make a crease of six points, and so on. Worn sections of cutting rule, flattened with a file, may be used as creasing rule by turning it upside down in the form.

MAKING AN ODD-SHAPED CUTTING DIE

Steel rule cutting dies are constructed in a different manner than are cutting and creasing dies for

folding boxes. Careful rule bending is essential for dies used for cutting out advertising novelties, cardboard toys, fans, fancy calendars, wall pockets, leather specialties, jewelers' display cards, etc.



Odd-shaped dies made from soft steel, set in laminated board

First, a laminated board, five-ply, eleven-sixteenths of an inch in thickness, and of a size that will take the die in question, is secured. Or, if the laminated board is not obtainable, some other wood, eleven-sixteenths of an inch thick, will do.

Second, patterns of the article or articles are cut out of cardboard with a sharp knife or scissors. If the subject or subjects have been printed or lithographed, the patterns are cut out of one of the sheets.

When the stock to be cut is blank, the pattern is made by drawing a diagram of the subject with pen or pencil on cardboard. The cutting of the pattern should be done very accurately, as the steel die is to be exactly the shape of the pattern.

Third, the pattern or patterns are laid in proper positions on the board, and a few tacks are inserted to hold them firmly. Then, with a heavy black pencil the outlines of the patterns are drawn distinctly on the block. The pencil simply follows the shape of the cardboard pattern. In the case where half-a-dozen dies are to be inserted in the same block—say for cutting out toy soldiers, for instance, which have been lithographed on a sheet—it is necessary first to cut out with knife or scissors the entire six patterns. The remaining portion of the lithographed sheet is then laid over the block so as to obtain exact position for the six dies. Otherwise, it would be hard to get the dies into register with the lithographed matter.

Fourth, the board is laid on the table of a power jig-saw, and all of the figures marked are carefully cut out with the saw. Care must be taken to have all of the places cut out by the saw vertically even. The pieces of wood which are sawed out of the board are saved intact. They are to serve as “plugs” for holding in the steel rule, and they are also to be used as

formers when bending the steel cutting rule. The saw removes just enough of the wood to allow for the inserting of the rule.

Fifth, the steel cutting rule is now bent to conform to the lines cut out in the block. When there is very intricate bending to be done, some die-makers heat the steel rule so that it can be bent easily, but it is not necessary to heat the rule in all cases. *Use soft steel cutting rule for this class of die-work.* The hard steel rule is used for straight-line dies where there is to be no bending of the rules. An ordinary vise can be used as an aid in the rule bending, although a special rule-bending machine is preferable. Pliers, of various sizes, are also very helpful in the rule bending.

The sawed-out pieces of wood are used as "formers." The steel rule is gradually bent to a form which will fit around the wood patterns accurately. All of the curves should be made with extreme care. Each bend must be straight *vertically*, else the face of the die will not be even. Care must also be taken so that the face of the rule will not be damaged during the bending. This kind of work must be done slowly and gradually. A perfect die means perfect cutting all through the run. An imperfect die will cause trouble in the presswork. The apprentice die-builder will have but little difficulty with the work if he follows these

instructions minutely. Heat the rule for all intricate curves, and wrap a cloth around the end while bending to avoid burning the hand holding it. Make every turn slowly but surely. Strive to do excellent work.

Some die-makers use full lengths of the soft steel cutting rule when shaping fancy or odd forms. Others use smaller sections of the soft rule, placing the pieces together as the work of bending progresses. Both methods are correct. It is easier to work with the small sections than with a long strip. It is not necessary to join the pieces of rule extra close, as the little openings make it possible for the cardboard sheets to hold together during the cutting operation on press. Three or four of these openings, or breaks, in the rule will do for the average die.

Sixth, after the rule has been bent to the shape desired, it is inserted in the block, using the cut-out pieces of wood to plug the rule in with. Sometimes it is essential to hammer in the plugs with the aid of a mallet, taking care to prevent splitting.

Seventh, the block is then locked up in a chase, with regular quoins, at the top and on the right-hand side.

MAKING A STRAIGHT-LINE CUTTING DIE

Hard steel cutting rule is used for all straight-line dies; that is, forms such as plain squares, oblongs,

diamonds, triangles, keystones, crosses, etc. The die can be blanked out with lead, steel, iron, or wood furniture, the same as with a cutting and creasing die for a folding box, or one large block of wood may be used, as in the case of an odd-shaped cutting die.

When a large board is used, the subjects are penciled and sawed out of the block on the jig saw. It is not necessary to miter the corners of steel rules for straight-line dies, although some die-makers do miter all rules where they join at corners. It is a good idea to leave at least two of the corners open so that the stock will hold together while cutting out on the press.

One reason why it is advantageous to saw a large block for holding dies of this class is that the entire die can be saved intact, and kept standing for a repeat order, without tying up any metal furniture. If there is a likelihood of the order coming in again, it would be well to have a block sawed for the die. The whole thing can be stored away for a long time without danger of the form breaking apart.

Laminated board is best for holding all varieties of steel rule cutting dies, as the laminated board will not warp or crack. Ordinary lumber will do for plain cutting dies which are to have only one run on the press. Or, blank out with metal.

When building ordinary square or oblong cutting

dies, there is no need of having a block sawed for the purpose, as it is an easy matter to blank out with metal or wood furniture. A die of this shape is seldom kept standing, as it is easy to rebuild.

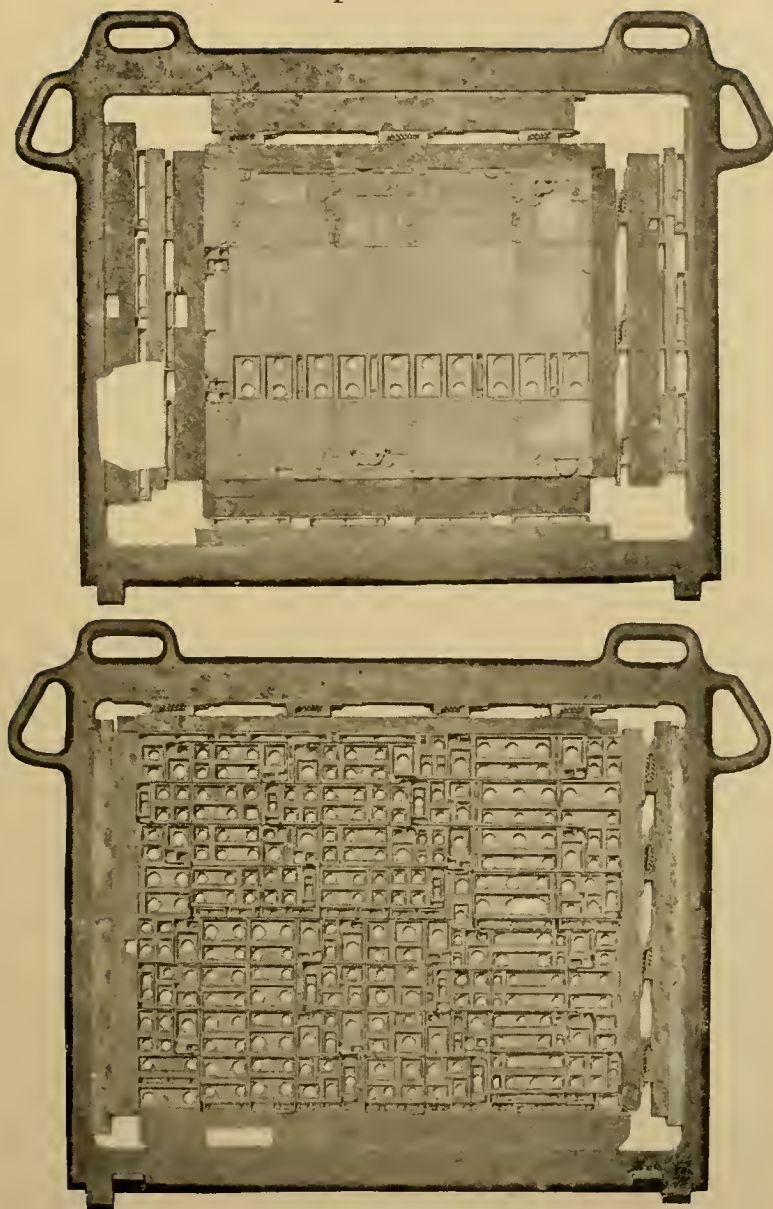
Straight-line dies are locked up in a chase in the same manner as any of the other dies mentioned.

MAKING READY A CUTTING AND CREASING FORM

As already stated, a regular cutting and creasing press will give the best results on work of this character. Standard platen printing presses, such as the Hartford, or Colt's Armory, may be used successfully for the work, provided, however, that such machines have steel or brass platen plates, about one-eighth of an inch in thickness. These plates are attached to the platen by means of screws. It is also possible to do cutting and creasing on cylinder presses when the machines are equipped with steel blankets about one-eighth of an inch thick. We will first explain how the make-ready of a die for a folding paper box is to be done on a standard cutting and creasing press:

Place the form on press, then see that the steel platen plate is in perfectly flat position with no make-ready of any kind underneath.

Lower the impression before starting with the



Two specimen forms of cutting and creasing work

make-ready through loosening the nuts and slides which hold the throw-off bar, and through moving the slides down several notches. It is better to start make-ready with a light impression. Now take a sheet of the stock which is to be cut and creased. Pull an impression of the die on it. If the sharp rules do not cut entirely through the stock, move up the slides a notch or two, and pull another impression on a sheet of the box-board.

When the slides have been properly adjusted so that the cutting rules cut through the stock sharp and clean, tighten the slide-nuts, and proceed with the make-ready as follows:

First, a sheet of straw-board, chip-board, or box-board is glued to the steel platen plate. LePage glue is best for this purpose, but any good fish-glue will do. The sheet should be large enough to take in the entire cutting and creasing die. Cover one side of the board with an even film of the glue. After the board has been pasted to the steel platen plate, rub over it briskly with a soft cloth and with the palm of the hand so that the board will adhere to the plate firmly and smoothly.

Second, take a small piece of a printer's inking roller, or a small paint brush, and with the aid of it ink the surface of all creasing rules in the form.

Regular printing ink will do. Care should be taken to have only the surface of the creasing rules "painted." Now pull an impression of the inked form on the sheet which has been glued to the platen plate.

Third, all of the places marked by the inked creasing rules are now cut out of the foundation board with a sharp knife. This cutting should be performed very accurately. The "channels" should be cut a little wider, however, than the surface size of the creasing rules involved. When the scoring rule is of two-point face, cut out a three or four-point "channel." If the rule is four-point face, cut out about six points, and so on. These crevices are to form a reverse die for the creasing rules. The stock is to be pressed into these channels on each impression, "intaglio," thus making clean, deep scoring which will not break the stock. The crevices are made slightly larger so that the stock will press into the channels comfortably. Remove all shreds of the cut-out cardboard so that the "female die" will be clear of all obstructions. *Do not cut out any of the places where the steel cutting rule has marked.*

Fourth, after the counter-die is completed, the feeding guides are attached. The guides may be of wood, lead or brass. Many pressmen use printers' brass rule, or slugs, twelve-point, about two inches in

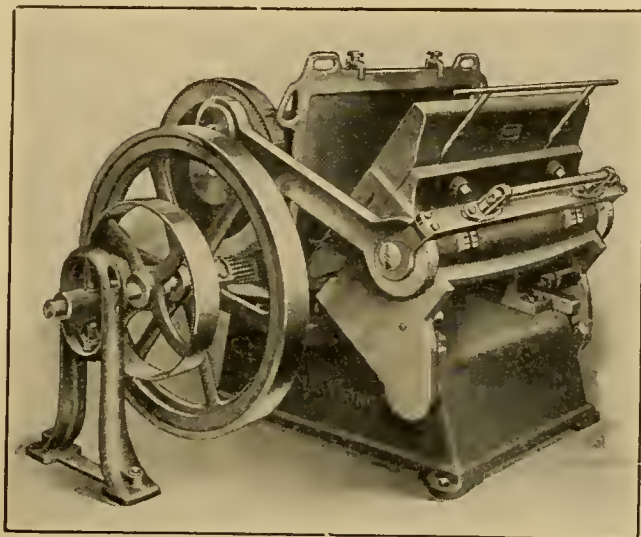
length. They are glued, on the flat side, of course, to the counter-die. If the counter-die does not extend far enough to take the guides, additional pieces of cardboard are glued to the platen plate for the guides. The guides should never be glued directly to the platen, as they would not hold firmly.

Fenders are made of thin brass rule, tin, or from small pieces of the steel cutting rule. One end of the fender is bent upward. The fenders are glued alongside of the feed guides, and they prevent the stock from pushing over the guides during the feeding operation. Use LePage glue for attaching both the guides and the fenders.

Fifth, when the guides are in proper position, pull an impression on a sheet of the stock which is to be cut and creased. It may be that some of the cutting rules require additional impression to make them cut sharply. "Spotting up" can be done on a sheet of white or manila paper, which should be about the size of the counter-die. Lay the cut-out sheet of box-board over this sheet, and with pencil mark the weak spots of rules on the paper. Make rough circles with the pencil, indicating the weak places in the cutting rule. "Spot up" these circles with pieces of paper (about forty-pound stock). Loosen the steel platen plate, and place the make-ready sheet under it in as

true position as possible. Put the platen plate back in position before taking another impression.

Other "patching up" can be done under the platen plate in the same way as described. After a cutting and creasing press has been in hard service for sev-



A cutting and creasing press

eral years the center of the platen is apt to become slightly hollow. This defect can be overcome by pasting several ovals of forty-pound paper on the hollow place, under the steel platen plate. One oval should be small, another larger, and the other still larger. Three or four of the ovals are usually sufficient to make the surface of the platen fairly even.

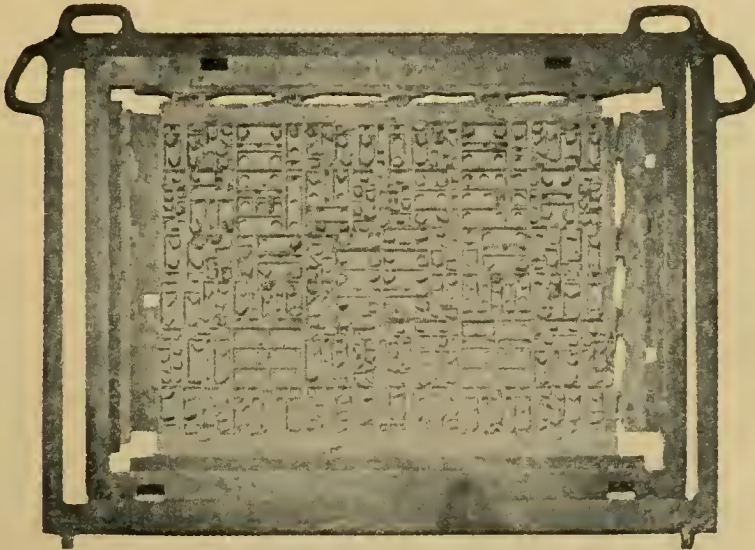
Some make-ready may be done in back of the form. Small pieces of heavy manila paper are pasted on back of rules which seem lower in height than others in the form. It is advisable, though, to have most of the "spotting up" done on a sheet placed under the platen plate. Some box-pressmen take an impression of a cutting and creasing die on a sheet of manila, and "mark it out," and "spot it up" after the manner of cylinder pressmen making ready a form of type. The sheet of manila is then placed in proper position under the platen plate. Such careful make-ready is not essential on ordinary cutting and creasing forms. A few small pieces of paper in the right places, under the platen plate, will do the work.

CORKING THE DIE-FORM

Some pressmen use cubes of rubber, others use ordinary corks for corking a steel die cutting and creasing form. The corking is done so that the stock will be pushed off from the sharp rules easily. It is an exceedingly important part of the make-ready. The majority of pressmen seem to prefer corks instead of the rubber cubes. Anyway, the corks are very efficient for the work. The size of the corks used is about three-quarters of an inch in height. The size of the face, or top, of the corks doesn't matter much,

although small corks, such as are often used for medicine bottles, produce good results. Large corks may be cut down to smaller sizes as needed.

The corks are glued in rows to the wood furniture in the form, close to the steel cutting rules, and on



Showing corks in place

each side of them. If improved metal furniture has been placed against the cutting rules instead of wood, longer corks are used, the ends inserted in the openings in the lead furniture. After the form has been corked, pull an impression on a sheet of the regular box-board. If it fails to leave the form easily, it will be necessary to attach additional corks. Keep put-

ting corks on until the desired result is accomplished. To aid in pushing off large sheets, some pressmen make "springs" out of folding cardboard in the form of a large "X." These springs are glued to the wood furniture, somewhere near the center of the die. Other pressmen use slices of garden hose for the purpose.

MAKING READY A STEEL CUTTING DIE

This refers to forms made up of steel cutting rules—not those which also contain scoring rules. These forms, it will be remembered, are for cutting out odd shapes, advertising novelties, cardboard toys, fans, squares, oblongs, circles, etc.

No "female die" is necessary for this class of cutting, as there is no creasing of the stock to be done. The counter-die consists of merely the bare steel platen plate the surface of which meets the sharp edges of the steel cutting rule.

Pieces of manila paper are glued to the platen for holding the feeding guides.

The "marking out" and "spotting up" are done in the same way as when making ready a cutting and creasing die. The make-ready sheet is placed in position underneath of the platen plate. Some patching up may be done in back of the form, using small pieces of heavy manila paper.

The die is corked after the manner of corking a cutting and creasing form.

With the aid of a small triangle file several notches are made in face of the steel cutting rule. This is done so that the cut-out shape and the waste material will hold together while being lifted from the form, and out of the machine.

MAKING READY STEEL-DIE FORMS ON REGULAR PLATEN PRESSES

As previously mentioned, cutting and creasing of paper box forms, and cutting of various shapes of cardboard, advertising novelties, fans, etc., can be done on platen printing presses of the Hartford and Colt's Armory style. A steel or brass platen plate, one-eighth of an inch thick, is an essential. If the presses are not already equipped with the platen plates, it would be necessary to have special machine-work done before attaching a new plate.

The make-ready of the die forms is done exactly the same as on a standard cutting and creasing press. It is necessary, of course, to have all inking rollers removed from a regular platen printing press before making ready the die.

Small steel rule cutting dies, for little job orders, can be run on light platen presses, such as an eighth

Gordon for instance, without using a steel platen plate. In such cases, a sheet of galvanized iron, or a sheet of heavy tin, is used in lieu of a steel plate. The sheet of iron or tin is glued to the platen. Make-ready and corking are done in the usual manner.

MAKING READY STEEL-DIE FORMS ON CYLINDER PRESSES

In many of the larger paper box factories cylinder presses of the drum (single revolution) type are running on cutting and creasing die forms. Some of these dies are very spacious, as many as a dozen complete paper boxes being cut out of a single sheet of board, simultaneously. In most cases these cylinder presses have been especially built for the work of the box-maker. A steel "blanket," one-eighth of an inch in thickness, has been covered over the drum cylinder, which has been raised higher than ordinarily to care for the extra "tympa." The construction is such that the pressman can lift up the steel blanket, when making ready, as he does regular paper tympa.

The drum cylinder presses are also used in numerous plants for cutting out life-size figures from printed and lithographed cardboard, such as are extensively used for advertising signs, etc. Cardboard toys, such as large doll houses, novelties, and so forth, are among the many other things which are cut out.

The inking apparatus is taken off entirely. The make-ready and the corking of the steel-die forms are done practically the same as on standard cutting and creasing presses. Most of the patching up of weak rules is done under the steel blanket.

It is possible to do cutting and creasing on regular cylinder presses by using a sheet of heavy gage tin or galvanized iron attached to the cylinder. It is not advisable to work extra large die forms on regular cylinder presses.

PRINTING, CUTTING AND CREASING ON SPECIAL ROTARY PRESSES

Some of the well-known paper box manufacturers have special rotary presses on which printing, cutting and creasing can all be done with the same operation. On these machines there are two cylinders—one for the printing impression, the other is for the cutting and creasing counter-die. As many as a dozen complete cartons can be printed, cut and creased on a single sheet of box-board.

EMBOSSING, CUTTING AND CREASING ON STANDARD PLATEN PRESSES

An embossing die can be worked along with a cutting and creasing die-form, on a standard platen

press of the Hartford type, or on a standard cutting and creasing press. We are speaking of colorless embossing such as is often noted on box lids of hat boxes, suit boxes, etc. The monogram, or the name and address of the advertiser is deeply embossed in the stock without first having the subject printed with ink.

A solid brass embossing die produces the best results. It is locked up with the cutting and creasing die. After the counter-die has been made for the cutting and creasing rules, an additional counter-die is constructed for the embossing die. Patented embossing composition can be used, or a good reverse die can be made of "Alabastine" (finely sifted), sodium silicate, and a small portion of fish-glue. Mix to the consistency of putty. Apply to the straw-board on the platen plate; spread a sheet of french-folio over the composition, and pull an impression (slowly). With a knife cut away all of the composition which has been squeezed to the outer edges of the counter-die. Take a dozen or so impressions until the detail of the male die has been worked up in sharp relief. The counter-die should then stand until it is dry and hard.

Embossing, cutting and creasing can also be done simultaneously on cylinder presses. The counter-die is made the same as on the platen presses.

FEEDING

On both platen and cylinder presses the feeding of the stock is done in the same manner as when feeding sheets for regular printing. The speed of the machines depends mainly upon the ability of the operator, and the conditions of the stock. When the sheets of box-board or other material are "curled," it is a good plan to have the sheets bent backward at each corner so as to make the feeding easy.

The stock should be piled up near the cutting and creasing presses so that it will not be necessary for the operators to waste steps in going after "lifts." Valuable time can be gained for the feeders if boys keep taking the sheets away from the presses as the work is completed.

Although practically all cutting and creasing presses are now equipped with gear guards and platen guards, pressmen and feeders are warned to be careful—exceedingly careful—when working on these machines. The writer knows of several cases where feeders have been maimed while working on cutting and creasing forms.

Never reach in the press for a sheet of stock no matter what may happen to the sheet. Have all forms corked so that the sheets will leave the die readily. If

the stock fails to hold together during the cutting operation, file a number of little notches in the steel cutting rule so that the sheets will not fall apart. All cutting and creasing work is more or less dangerous. *At all times be careful!*

STRIPPING

After the stock has been run through the press, it is carried to the finishing department where the stripping is done. Girls and boys take the sheets—about fifty at a time—and pull the waste material from them. A mallet is useful in this work. Intricate cut-outs of advertising novelties, box-corners, etc., are “hammered out” with the mallet. A sharp blow with the mallet while the pile of stock is extending over a large wooden box, and all of the waste pieces fall out.

Rough edges of fans, novelties, etc., are smoothed with a few brisk rubbings of emery paper.

ADDITIONAL SUGGESTIONS

In a regular cutting and creasing department there should be a number of extra chases, also a number of extra steel platen plates. Through having these additional, intricate die forms, and counter-dies, for repeat orders, can be kept standing intact. For example, a steel platen plate containing an important

counter-die is removed from the press after the run has been finished, and the plate and counter are put away for future service. The steel die is kept locked up in the chase. Later on the form and platen plate are put on press again, and there is no make-ready necessary for the repeat order.

A steel platen plate is better than one made of brass. When the steel plate becomes marked with lines from the steel cutting rules, its usefulness is not affected in the least. Some pressmen smooth the surface of roughened steel platen plate with fine emery cloth, but this is not essential.

When steel cutting rules in a die become somewhat dull, the edges may be sharpened with emery cloth. Fold the emery cloth, put a few drops of machine oil on it, and rub the cloth along both sides of the cutting rule.

When an unusually large number of corks have been glued to an intricate die-form, it may be necessary to increase the entire impression of the press. Raise the slides holding the throw-off bar one notch, or place a few sheets of heavy manila paper in back of the form.

Save corks and pieces of steel rule which are in fair condition when breaking up "dead" forms. This material can be used again for other forms.

Never build a die with combinations of worn rule and new rule. Use all new rule or all worn rule.

Keep all tools in the best of condition, and have one particular place for all tools.

Have a box of corks, in assorted sizes, near each press, ready for instant use as additional corking is required for troublesome forms.

Make it a practice to oil the press twice every day, in the morning before starting work, and immediately after lunch-time.

Keep the presses clean.



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